Massive Advantage in Mining

Using Scrapers for Efficient Material Transportation

Agenda

- Scraper Overview & Benefits
- Using Articulated Dump Trucks (ADT's) or Rigid Frame Dump Trucks to pull scrapers
- Comparing scrapers to traditional mining equipment
- Quarry Jobsite Study
- Phosphate Mine Scenario
- Question Period

Scraper Overview

- Scraper is a machine designed to pick-up, transport, and eject material.
- Construction, ejector style scrapers.
- Use High-Tensile Steel for wear abrasion, and light-weight strength.
- Capacity may exceed that of a truck dump box.

Heaped Capacity Range	Cubic Yards	Cubic Metres	Tons
Minimum	28	21	35
Maximum	72	55	99

Scraper Benefits

- Scraper can move material with a single operator and single power-unit.
- Key for removing overburden and maintaining haul roads.
- Can also be used as haulers to top load rock into the large, low target scraper bowl.

Scraper Benefits

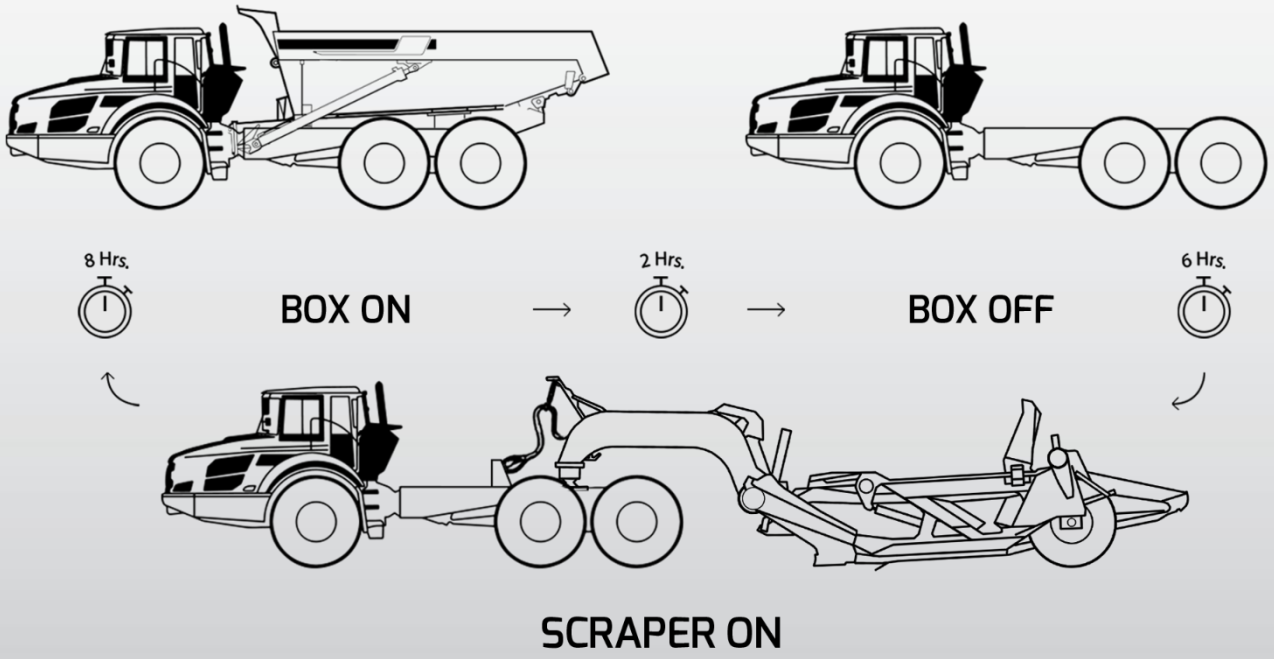
- Scrapers have proven effective in the following jobsite applications:
  - Overburden Removal
  - Haul Road Maintenance
  - Mine Reclamation Projects
  - Gravel Quarries
  - Coal Mines
  - Gypsum Mines

Power-Units to Pull Scrapers

- New industry trend of mining companies using Articulated Dump Trucks or Rigid Frame Dump Trucks as the power-units to pull scrapers.

Power-Units to Pull Scrapers

- The removal of the dump box and attachment of the scraper to the truck chassis is a helpful way to get more versatility out of an existing fleet of mining equipment.



Comparing scrapers to traditional mining equipment

- Scrapers Vs. ADT & Excavator

Quarry Jobsite Study

- Texas Crushed Stone Co (TCS) of Georgetown, TX
- Serve the aggregate needs of Texas and Louisiana for road base, under slab fill, & concrete ingredients.
- The quarry spans approximately 7,500 acres and is considered the state's largest.
- A world leader in the aggregate industry, identified the need to introduce improved equipment to efficiently transport quarried limestone.

Quarry Jobsite Study

- TCS Determined that two 43 yd^3 scrapers pulled by ADT's is the solution to transport, dump, and level the stone all by themselves.
- large capacity of the scraper would mean less trips around the quarry. Saving significant costs on labor, fuel, and equipment maintenance expenses.
- The ADT's drive the scrapers underneath overhead bin chute bins. Up to 3" diameter crushed limestone is released, and fills up a heap in the scraper bowl.

Quarry Jobsite Study

- The trucks then travel up to 30 mph to carry the limestone across the quarry for further processing.
- Scrapers allow for stone to be mixed into a consistent grade by ejecting in thin layers. This could not be achieved with an ADT dump box.
- TCS used scrapers as a massive advantage. This forward-thinking outlook aims to propel the company for continued success in the next 50 years and beyond.

Phosphate Mine Scenario

20-Year phosphate mine project in Peru

- 271 million yd^3 overburden to be removed.
  (207 million m^3), (373 million Tons)
- 135 million yd^3 phosphate to be mined.
  (103 million m^3), (186 million Tons)
- 7700 feet Average Haul Road Distance
  (2348 metres), (1.45 miles)

Phosphate Mine Scenario

Mine Equipment Involved on site:

- Mine Track Conveyors
- Spreaders
- 3 - Big Wheel Excavators (BWE)
- Surface Miners
- 10 - Articulated Dump Trucks (40 Ton)
- 20 - Construction Scrapers in tandem configuration (72 yd^3)

Phosphate Mine Scenario

Cost of Scraper Ownership (Per Unit)

- Purchase price of a single ADT & Tandem scraper combination = $1,250,000
- Annual Cost of Ownership (3 years at 5500 hrs/year) = $466,667
- Annual Operating Cost = $506,209
  - Labor per hour = $20
  - Fuel per hour = $65
  - Consumables per hour = $12.64
  - Maintenance per hour = $10.64

Phosphate Mine Scenario

Production Outcomes

- Equipment Capacity = 72 yd^3 (55 m^3), (99 Tons)
- Average Haul Road Speed = 17 mph (28 km/h)
- Loading & Unloading Time = 200 seconds (3.33 minutes)
- Total Round Trip Travel Distance = 7700 feet (2348 metres), (1.45 miles)
- Load Factor Efficiency = 85%
- Availability Factor = 85%

Phosphate Mine Scenario

Operating Results

- Material moved per cycle = 61 yd^3 (46 m^3), (84 Tons)
- Cycle time = 8.36 minutes
- Cycles per hour = 7.17 per unit
- Material moved per unit tach hour = 438 yd^3 (335 m^3), (604 Tons)
- Material moved per year per unit = 2,050,465 yd^3 (1,567,693 m^3), (2,829,641 Tons)
- Cost = \$0.47/yd^3 (\$.62/m^3), (\$.34/Ton)

Phosphate Mine Scenario

Project Goals

- Required to move: 406 million yd^3 overburden/phosphate in 20 Years.
- 10 Trucks and 20 Scrapers move: 20.5 million yd^3 per year.
  (15.6 million m^3), (28.3 million Tons)
- Over 20 Years: 410 million yd^3 may be moved.
  (313.5 million m^3), (565 million Tons)

Summary

- Scrapers use High-Tensile Steel for wear abrasion in rugged mine environments.
- Scrapers can move material with a single operator and single power-unit.
- Scrapers can be effective in various different mine applications. (overburden, haul road maintenance, and material transportation)
- Major mining operations are investigating the trend towards scrapers.
- Gain your own massive advantage in your mining operation by incorporating scrapers into your fleet.

Question Period

- Any further questions to clarify this new mining concept?

Thank You

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